Mid-Western Educational Researcher

Volume 19 | Issue 4 Article 6

2006

Multi-context Use of Language: Toward Effective Thinking and Planning for Curriculum

Anne D'Antonio Stinson
University of Wisconsin - Whitewater

William Chandler
University of Wisconsin - Whitewater

M. Virginia Epps
University of Wisconsin - Whitewater

Melissa Frieberg
University of Wisconsin - Whitewater

Multi-context Use of Language: Toward Effective Thinking and Planning for Curriculum

Anne D'Antonio Stinson
William Chandler
M. Virginia Epps
Melissa Frieberg
University of Wisconsin-Whitewater

Abstract

The flexible, multi-contextual use of language is essential to integrated learning and thinking. Likewise, learning and thinking in an integrated way is essential to multi-dimensional teaching. This study examines the ways pre-service secondary teachers define their subjects. Students enrolled in a secondary reading methods course were asked to provide multiple definitions for a predetermined list of critical vocabulary terms common to multiple disciplines. We used these definitions to measure participants' level of sophistication with regard to the multi-context use of language. Participants' responses illuminated implications for curriculum development in secondary schools including the need for models for pre- and in-service teachers of authentic integrated curriculum.

Introduction

Central to every teaching/learning situation is the preparation and presentation of content. Teachers and other instructional specialists work at great lengths to organize learning experiences that will insure student engagement and bring about significant intellectual change. One way of accomplishing this goal has been to foster recognition of real and perceived linkages between topics and content. This practice has been described in schools and professional development workshops using various terms such as connected curriculum, integrated curriculum, cross-disciplinary curriculum, and interdisciplinary curriculum. Implicit in each of these terms is the idea that curriculum is as multi-dimensional as the students' lives. Thus, to make meaningful connections to their lives, students must experience multi-dimensional, integrated curriculum. Unfortunately, the reality of integrated curriculum is often the trivialization of content by practices that not only fail to make these connections, but also suppress the processes of meaningful content acquisition. This is the case if one assumes that curriculum is integrated for writing if any writing is done, for math if any calculations are performed, for science if any natural phenomenon is mentioned, and/or for art if any visual is created, regardless of developmental or educational appropriateness.

Curriculum that connects to students' lives results in a more significant development of knowledge, skills, and dispositions than will traditional, departmentalized, content-area instruction. When substantial integration of curriculum is present, students perceive and respond to concepts across disciplinary boundaries rather than as elements of discrete subjects, and communicate these concepts through multiple representational forms. They exhibit flexible thinking and their work reflects multiple perspectives. Those outside of the classroom begin to hear a different kind of conversation about what is being learned. Importantly, however, while all of this synthesis is occurring, the parent disciplines maintain their integrity.

Background to the Study

In 1997 two of the authors organized a graduate level summer workshop entitled "Math and the Arts." This three-week seminar was intended to provide an engaging setting in which in-service teachers could thoughtfully consider how the arts could be employed in the teaching of mathematics. The course was team taught by three content area specialists, one from each of the following: math, music, and art. The format was dialogic, rather that didactic. While the faculty provided content expertise from the different disciplines, they also sought to model dialogism in order to break down, as Bakhtin (1981) suggests, the barriers created by context-specific languages. Ten in-service teachers signed up for this graduate course. The seminar resulted in intense, productive, mediating discussion between faculty and students (as well as among students and among faculty) and some practical curricular applications that the in-service teachers have subsequently reported to the instructors. We (the current group of authors) have continued the discussion of integrating disciplinary subject matter, in part as a result of the recognition that any integration of content should be grounded in more than the production of quick-and-easy, simplistic, hands-on learning activities.

A part of our extended discussion focuses on discipline-specific vocabulary. Despite differences between disciplines, there are many commonly used terms whose definitions differ, to varying degrees, across the disciplines. We decided to explore the potential of these shared terms as means for grounding or planning and organizing meaningful integrated curriculum development. This study investigated how pre-service teachers know and understand words as part of their

own area of study, as well as how they might extend into other academic disciplines.

Review of the Literature

Curriculum is a manifestation of how humans think. Curriculum, as it is formulated for any of its applications (schooling, job training, and even the passing on of family cooking traditions), is an attempt to order a set of ideas so that those ideas can be captured and that understanding can be developed by the receiving individual or "learner." The varied terms educators associate with curricular design give evidence to methods of ordering what is to be learned. The term "sequential curriculum" suggests a gradual progress toward learning goals through a series of learned skills, while "spiral growth curriculum" suggests planned repetition as a way of working toward learning goals. Even the term "thematic curriculum" suggests a collection of concepts based on links associated with a chosen topic of study. However, when curriculum is practiced in real-life settings, the single course of study occurs as a gestalt; the ideas communicated are greater than the sum of their parts. There is a holistic presence about the things that are taught. Within the educational system (and for our purposes) this concept is known as integrated curriculum. The term describes a curricular format that attempts to frame the world's reality as interacting and interdependent. By moving beyond more narrow, discipline-centered orientations it is intended that deeper and more personal learning will occur.

Dewey framed a view of the world as "an impressive and irresistible mixture of sufficiencies, tight completenesses, order, recurrences which make possible prediction and control, and singularities, ambiguities, uncertain possibilities, processes going on to consequences as yet indeterminable" (Dewey, 1958, p. 47). To navigate this complexity Dewey encouraged reflective thinking. Dewey urged that reflection should be grounded in an education of experience (Dewey, 1997). Powerful knowing would result from an interaction with real-world problems. Since the situational nature of the world is multidimensional and affords viewing from a number of perspectives, his proposal describes both a need for and a practice of curricula that is integrated.

Goodman's (1968) description of how an individual comes to understand the world also offers insight into an integrated curriculum format. For Goodman every time a person is confronted with a perceptual phenomenon there is an opportunity for interpretation. Nothing that is experienced need be interpreted as it has been; instead, each encounter requires a renegotiation of object and setting by the individual. Worldmaking involves the continuous constructing of a point of view that presents the sum of previous interpreted experiences. The association of personal beliefs to the construction of knowledge is also central to the work of Greeno (1989) regarding situated cognition. While he suggested that critical thinking "has to do with whether individuals think reflectively" (p. 139), he also recognized the role of contextuality in learning. One's beliefs and subsequent actions are best established within a context. An integrated curriculum attempts this by setting at least a mental context for that which is to be learned.

Currently, two additional conditions exist that give currency to the practice of integrated curriculum. One is the theoretical work of Howard Gardner. The second is the standards-based movement that has grown out of the Goals 2000 efforts and continues with No Child Left Behind. Gardner (1993) has noted that we all have propensities for at least seven basic ways of knowing. As this theory has been played out among teachers and curriculum developers, these "multiple intelligences" realize avenues of access for learners. Curriculum is thus organized in ways that facilitate learning for each student. While this is not exactly an integrated curriculum organization, it does lead educators to recognize that content has multiple dimensions and that learning and knowing can be personalized to the intellectual aptitudes of the learner. Additionally, the current rush to standards has had an impact on curriculum development. Within recent years, in response to Federal mandates, professional organizations have developed "standards," or statements of what learners should know at the conclusion of their mandatory education. Within each of these collections of standards is a call for "making connections between . . . disciplines" (e.g., National Standards for Arts Education, 1994, p.72). As a result, curriculum developers are seeking ways to incorporate the skills of analysis and synthesis into the disciplines of the curriculum so as to bring about deep and reflective knowing across the disciplines.

Integrated curriculum is not a new concept; however, there are barriers that prevent it from becoming a substantial reality in classrooms. Curriculum must be organized in ways that encourage more than the linking of knowledge across disciplines. Integrated curriculum is an educational endeavor that seeks to engage learners in the mediation of meaning. Vygotsky (1986/1934) described that word meanings evolve "with the various ways in which thought functions" (p. 217). Understanding core terms and their specific meaning within multiple contexts is central to being able to synthesize meaning across disciplines.

Methodology

Purpose of the Study

The current study represents an effort to investigate how pre-service teachers operationalize the use of language in multiple contexts. Our intent was to investigate how pre-service teacher education students organized and articulated their own working definitions for these terms. This investigation provided insight into the difficulty those students will have when they, in essence, repeat the task in their own curriculum development activities as in-service professionals. We decided to focus on how shared vocabulary might provide an important stepping-off point for meaningful cross-curricular instruction. The following question guided our

research: Do students perceive words as having discipline-specific meanings and are these meanings associated with the participants' major or minor area of study?

Data Collection

Initially, we each gathered a list of words which we individually believed had both specific or "special" meaning in our respective disciplines (art, language arts, math, and science), as well as different special meanings in one or more other content areas and/or in general usage. We combined these lists to form an alpha-list of 160 vocabulary terms. Once this list was complete, each of us reviewed the list with the following direction: "Eliminate any words that you think *will not* have content-specific meaning across two or more disciplines." All words eliminated by at least one team member were dropped from further consideration. The resulting list contained eighty words, one half of the original list.

We then reviewed the eighty-word list in order to select the best words, i.e., those words that promised to elicit the richest and most varied responses to our request for multiple definitions. The art specialist among us selected eighteen words, the language arts specialist selected thirty-three, the math specialist selected fourteen, and the science specialist selected twenty-seven words. A short list of the eleven words selected by at least three of the four content area specialists resulted. We randomly arranged these eleven words for use in the survey instrument. The survey instrument listed the following eleven words in this order: rhythm, balance, space, set, interaction, intensity, analogous, pattern, density, composition, and contrast.

Participants

Participants in this study were enrolled in one of two sections of a required content area literacy course taught by one of the researchers. The students were pre-service teachers in secondary education who either held baccalaureate degrees or were seniors who anticipated graduation within one or two semesters. Each of the participants had a major in one of the following content areas: art education, business education, English/language arts, English as a second language, foreign language, health, math, music education, physical education, one of the natural sciences, or social studies. Seventy-six pre-service teachers of the 85 enrolled in the course participated in this study.

The Survey Instrument

The survey instrument asked students to provide information about their major(s), minor, gender, and degrees held or expected. No other demographic information was collected.

The instrument provided space for three separate definitions for each of the eleven terms. A researcher instructed the participants to complete the demographic information and then to think of as many definitions for each of the terms as they could and record one in each block. While students were free to elect not to have their definitions included in our data pool, they were required to provide the definitions for use in a class discussion of effective content-area vocabulary instruction.

Coding

Schloss & Smith (1999) suggest that categories of content will emerge as a result of an initial review of the data (p. 190). The review of our data suggested several categories of response (see Table 1). We each prepared a master list of definitions to use as a reference during the coding process; each content-area specialist provided discipline-specific definitions for all eleven words. We then independently coded

Table 1
Categories and codes for analysis of definitions.

A. Usage	01	General
	02	Specific, i.e., definition associated with a discipline, but not the student's major or minor
	03	Specific, i.e., definition associated with a discipline which is the student's major
	04	Specific, i.e., definition associated with a discipline which is the student's major
	05	Technical, i.e., definition given is tightly restricted to a discipline. E.g., mass/volume, g/ml, or g/cm^3, but not the student's major or minor
	06	Technical, i.e., definition given is tightly restricted to the discipline of the student's major
	07	Technical, i.e., definition given is tightly restricted to the discipline of the student's minor
	08	Slang
B. Part of Speech	01	Adjective
	02	Noun
	03	Verb
C. Concept Accuracy	01	Correct; definition given is consistent with accepted usage in at least one discipline or in general usage
	02	Incorrect; definition given is not consistent with accepted usage in at least one discipline or in general usage
	03	Incomplete or partially correct; definition too vague to recognize

the raw data for usage (general, specific, or technical), association with the participants' majors and minors, parts of speech, and concept accuracy.

Data Analysis

As indicated above, two questions guided our investigation of how pre-service teachers operationalize the use of language in multiple contexts. We hypothesized that the answers to each of our questions would be affirmative.

Question #1 Do students perceive words as having discipline-specific meaning?

Sub-question a: Do the students submit multiple definitions for each of the given words? The participants were asked to provide as many definitions (up to three) for each of the terms as they could think of. In practice, they provided from none to three definitions. We have provided the definition counts for the two words that the research team felt to be most informative for the purposes of this article: *pattern* and *balance* (see Tables 2 and 3). Of the two, *balance* appears to be the more productive, resulting in 147 definitions as opposed to 113 definitions for *pattern*. As a second indicator of the greater productivity of *balance* when compared to *pattern*, note that for *balance*, 71% of the participants produced more than one definition while only 47% of the participants produced more than one definition for *pattern*. The answer to this sub-question then becomes affirmative; yes, the participants did record multiple definitions for each term. However, the degree of productivity varied and it is important to note that this sub-question does not consider the issues of redundancy and accuracy.

Sub-question b: Are the definitions given related to a specific discipline? We hypothesized that the participants would provide definitions linked to at least one specific discipline. Tabulation of the researchers' coding showed unexpected variability; even so, some trends became evident (see Tables 4 and 5). Fifty-nine percent of the definitions for *pattern* were associated with a specific discipline while 55% of the definitions for *balance* were associated with a specific discipline. Therefore, the answer to sub-question b must be an unenthusiastic or weak "yes."

Sub-question c: Are these definitions generally accepted by at least one discipline? Because we initially hypothesized that the first definition the participants gave would be associated with the discipline of their major or minor, we expected to see definitions that would generally be accepted by at least one discipline among the definitions submitted. Again, an unexpected level of variability among the researchers' coding confounded analysis and interpretation; however, this variability in itself became instructive and stimulated worthwhile discussion of the problem of multi-context meanings of key concepts in the respective disciplines of the arts, mathematics, literacy, and the natural sciences. Tables 6 and 7 show that only 34% and 45% of the definitions for *pattern* and *balance,* respectively, were coded by at least three of the four coders as being consistent with accepted knowledge in at least one discipline; therefore, the answer to the third sub-question must be "no."

Question #2 Are the first definitions reported tied to the participants' major or minor?

The coders classified only 2% of the responses for *pattern* as "first entry tied to major." For *balance*, only 14 % were convincingly classified as "first entry tied to major." The answer to question two also must be "no."

Findings and Implications

Implications for Further Research

We had hypothesized that secondary education students would identify terms first with their major or minor areas of study when giving definitions; additional definitions would demonstrate their ability to cross over to another content area or to general usage. However, we found little to sup-

Table 2
Definitions provided for pattern

Number of definitions per participant	Number of participants	Total definitions produced	Percent of the participants
0	3	0	4%
1	37	37	49%
2	32	64	42%
3	4	12	5%
Total	76	113	100%

Table 3
Definitions provided for balance

Number of definitions per participant	Number of participants	Total definitions produced	Percent of the participants
0	1	0	1%
1	19	19	28%
2	37	74	49%
3	17	51	22%
Total	76	146	100%

port our hypothesis due to the form the students' definitions took. In the current study, students were asked to generate definitions for the indicated terms used within two or more content disciplines. Often those definitions tended to be vague and general in nature rather than tied to a specific discipline. Although there were some definitions that were able to be identified with specific disciplines, they usually did not completely match the accepted definition nor did they necessarily match with the students' discipline. One possible way to better test this hypothesis in a future study would be to provide several correct (according to different disciplines) definitions listed and ask students to list them in the order of their own primary understanding of the term.

As noted in the methodology section, we developed a coding system for this study to allow us to analyze the definitions provided by students for content area usage and con-

Table 4
Frequency of category assignation for pattern

Type of definition	Number of coders	Codes	Number of definitions	Percent of definitions
General	3 or more	1	46	41%
Special	4	2, 3, or 4	12	11%
	3	2, 3, or 4	24	21%
	2	2, 3, or 4	31	27%
Technical	4	6 or 7	0	0%
	3	6 or 7	0	0%
	2	6 or 7	0	0%
Total			113	100%

Table 5
Frequency of category assignation for balance

Type of definition	Number of coders	Codes	Number of definitions	Percent of definitions
General	3 or more	1	65	44%
Special	4	2, 3, or 4	10	7%
	3	2, 3, or 4	28	19%
	2	2, 3, or 4	43	29%
Technical	4	6 or 7	0	0%
	3	6 or 7	0	0%
	2	6 or 7	0	0%
Total			146	99%

Table 6
Concept accuracy or consistency with accepted knowledge for pattern

Number of coders	Codes	Number of definitions	Percent of definitions
4 of 4	1 (consistent)	13	11%
3 of 4	1 (consistent)	26	23%
≥2 of 4	2 (inconsistent)	16	14%
≥2 of 4	3 (vague)	52	46%
mixed	1,1, 2, & 3	6	5%
Total		113	99%

Table 7
Concept accuracy or consistency with accepted knowledge for balance

Number of coders	Codes	Number of definitions	Percent of definitions
4 of 4	1 (consistent)	33	23%
3 of 4	1 (consistent)	32	22%
≥2 of 4	2 (inconsistent)	20	14%
≥2 of 4	3 (vague)	39	27%
mixed	1,1, 2, & 3	22	15%
Total		146	101%

cept accuracy. However, due to the incomplete or inaccurate definitions given by the participants, and partially due to an incomplete or inaccurate understanding of other definitions by the researchers themselves, this coding did not result in reliable findings; there was no inter-rater reliability. We believe two factors contributed to this breakdown. Even with definitions provided by the research team, the researchers themselves had difficulty identifying (1) the level of "correctness" consistently across disciplines, and (2) which discipline (if any) a definition belonged to. For example, many participants defined the term "pattern" as a guide used for a sewing project. We were forced to ask ourselves, is this an accurate definition in the field of family and consumer education or a term of general usage? A future study, as indicated above, should start with clear definitions of terms for various disciplines, and those doing the analysis of the student responses should have clear agreement on what defines each code.

Finally, a future study might ask students to do more than provide or chose definitions. It might also ask students to (1) decide what is the key or most salient part of the definition of the term across all disciplines or (2) identify consistencies or inconsistencies in the definitions across disciplines. These efforts may lead to a better picture of the readiness or ability of pre-service teachers to engage in cross-disciplinary or integrated curriculum instruction.

Implications for Practice

As teacher educators look to create opportunities for pre-service teachers to develop curriculum and instructional strategies for integrating content disciplines, we must stress the importance of the nature and integrity of each discipline. Without thoughtful application in the classroom, integration may become artificial or inaccurate, and may force associations among concepts. Connections across disciplines may be tenuous and the content of one or more disciplines may not be in line with grade level standards or curriculum requirements. Efforts to correct these problems are hampered by students', teachers', and a community's perceptions of disciplines as distinct and mutually exclusive. Our research points out that pre-service secondary teachers have difficulty conceptualizing terms as being used in multiple disciplines and are unable to distinguish nuances of those definitions that apply more to one field than another. Similarly, we ourselves, as faculty from different disciplines, were often in disagreement over the "correctness" of definitions from areas other than our own. Much work needs to be done in the area of teaching through integrated curriculum.

First, we propose that faculty, at both the post-secondary and secondary school levels, need to spend more time in dialog about the essence of concepts and skills to be taught and how those concepts or skills can be illustrated, applied, understood, or extended through various disciplines. The scheduling structure of many middle schools allows team planning time that should allow those types of discussions to take place, if that time is properly used. However, the departmentalized schedule of high schools and universities does not provide the opportunity or structure to allow, much less encourage, these discussions. Schools operating under different models, such as charter or alternative schools, especially need to build in this feature since they are the types of schools most likely to be using some form of cross-disciplinary teaching. The discussion not only builds a basis for instruction, but also helps participants to generate language that is inclusive and clear.

Second, cross-disciplinary teaching requires the use of clear and inclusive language to connect ideas and concepts as they really exist, not as we isolate them for the purpose of teaching a discipline. For secondary teachers and their students, who have been educated to see disciplines as separate, efforts need to be made to point out the consistencies, similarities, ties, and fine discriminations among content areas through language, images, symbols, and actions. Too often teachers expect students to make these generalizations or distinctions with little practice or guidance, or may not recognize them as correct when students do. Integrated curriculum does not require the use of language that is so general as to encompass aspects of many disciplines at the same time, nor is it desirable to do so. Such efforts would lose the beauty and the essence of both language and the discipline. What is required is an understanding of how the nuances of language provide insight and meaning within and across disciplines and how language in the context of one discipline can help illuminate another.

Third, there is a need for models for pre- and in-service teachers of true integrated curriculum and instruction. Interestingly, institutions of higher education often provide interdisciplinary courses for students to take, but rarely are they found in schools or colleges of education. Although we sometimes combine some methods of teaching various content areas, they are generally taught as separate courses by specialists in the respective fields. We need to explore ways to structure courses, content, assignments, and expectations to support content integration.

References

Bakhtin, M. (1981). *The dialogic imagination: Four essays*. Austin, TX: University of Texas Press.

Dewey, J. (1960). *How we think*. Lexington, MA: D. C. Heath and Company.

Dewey, J. (1997). *Experience and education*. New York: Touchstone.

Gardner, H. (1993). *Frames of mind: The theory of multiple intelligences*. New York: Basic Books.

Goodman, N. (1978). *Ways of worldmaking*. Indianapolis, IN: Hackett Publishing Company.

Greeno, James G. (1989). A perspective on thinking. *American Psychologist, 44*(2), 134-141.

Schloss, P. & Smith, M. (1999). *Conducting research*. Upper Saddle River, NJ: Prentice-Hall.

Vygotsky, L. (1986/1934). *Thought and language*. Cambridge, MA: The MIT Press.